

REMARKS/ARGUMENTS

Favorable reconsideration of this application for the reasons noted hereinafter is respectfully requested.

Claims 1-8 remain active in this case, Claims 9-20 having been withdrawn from consideration as directed to a non-elected invention.

In the outstanding Official Action, Claims 9-20 were withdrawn from consideration as directed to a non-elected invention; Claims 1 - 4, 7 and 8 were rejected under 35 U.S.C. 102(b) as being anticipated by Koike (U.S. Patent No. 6,392,300); Claims 5 and 6 were rejected under 35 U.S.C. 103(a) as being unpatentable over Koike in view of Ueno (U.S. Patent Application Publication No. 2005/0140013); and Claims 1-8 were further rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of Koike.

Applicant respectfully traverses the outstanding grounds for rejection, because in Applicant's view, the outstanding grounds for rejection are based on a misunderstanding of the cited prior art and it is Applicant's view that the claims patentably define over the cited prior art.

In particular, it appears that a key underpinning of the outstanding grounds for rejection is that Koike discloses an alignment mark formed using low-permittivity insulating layers (i.e. BPSG which inherently has a dielectric constant of 3.0 to 2.5). However, no low-permittivity insulating layer is used in Koike. On the contrary, BPSG is not a low-permittivity insulating layer; nor does it have a dielectric constant of 3.0 to 2.5. Therefore, the outstanding rejection is based on the misunderstanding of the disclosure of Koike and is respectfully traversed.

Further commenting on the teachings of the Koike reference, Koike is directed to preventing alignment mark 27A for a fuse-blow from peeling. After the side surfaces of an insulating film are over-etched to expose alignment mark 27A in a pad opening step, alignment mark 27A frequently peels off. When the peeling occurs, alignment mark 27A is not detected or the fuse-blow cannot be performed. Additionally, when a barrier metal

exposed in a region other than a bump electrode region is removed using a solution, an alignment mark for a fuse-blow under the barrier metal is often undesirably etched. Koike therefore prevents the alignment mark under the barrier metal from being etched so that the alignment mark can be detected when performing the fuse-blow.

In contrast to Koike, the claimed invention prevents low-permittivity insulating layers used as insulating films between multilevel interconnections from peeling. To that end, the claimed semiconductor device includes an alignment mark formed by part of an uppermost interconnection layer in a multilevel interconnection formed on the semiconductor chip. The alignment mark is obtained by stacking low-permittivity insulating layers and interconnection layers to prevent the low-permittivity insulating layers from peeling. More specifically, the alignment mark is, for example, formed in contact with a dicing line and connected to a silicon substrate via lower Cu interconnections (plugs), thereby physically reinforcing a chip end. Koike does not disclose or suggest any alignment mark having a structure as recited in pending Claims 1 - 8. It is therefore respectfully submitted that the claimed invention is not anticipated by Koike which discloses an alignment mark having a different structure than as claimed.

In support of the outstanding rejection, the outstanding Official Action states that the alignment mark of Koike is equivalent to the claimed alignment mark since the alignment mark of Koike is provided in each corner of a semiconductor chip. However, the alignment mark of Koike is formed above an inter-chip region (for example, see Koike, column 5, lines 10 - 12). The claimed invention thus clearly differs from Koike in structure, and the outstanding rejection of Claims 1-4 and 7-8 as anticipated by Koike is traversed.

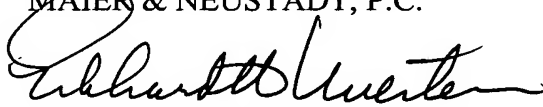
Ueno cited in the rejection of Claims 5 and 6 discloses a barrier film and a SiCN film. As Claim 5-6 ultimately depend on Claim 1, and since Ueno does not cure the above-noted deficiencies of Koike, it is respectfully submitted that pending Claim 1 is not rendered obvious by the combined teachings of Koike and Ueno, nor are Claims 5-6 which depend from Claim 1. Accordingly, the outstanding rejection of Claims 5-6 as being obvious over the teachings of Koike and Ueno is traversed.

Next addressing the outstanding double patenting rejection, it is pointed out that Claim 1 of Koike does not recite a low-permittivity insulating layer as a constituent element. Though claim 1 of Koike recites an alignment mark, this alignment mark is not provided on a low-permittivity insulating layer or arranged in contact with each corner of a semiconductor chip. Insofar as these features, stated in Claim 1, are not recited in Claim 1 of Koike, it is respectfully submitted that the pending Claims 1-8 are patentably distinct over Claim 1 of Koike, and the outstanding double patenting rejection is likewise traversed.

Consequently, in view of the above comments, Claims 1-8 are believed to be patentably distinguishing over the cited art and Claim 1 of Koike and in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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